UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

December 1, 1997

Mr. Crick Waters
Applied Process Technology
NASA Ames Research Center
Building 223, #102
Moffet Field, CA 94035

Dear Mr. Waters:

Thank you for taking the time to travel to our regional office and discuss Applied Process Technology's efforts to develop a treatment technology for possible use at the Baldwin Park Operable Unit. As promised, I have prepared a list of questions about your company's studies of the effect of ozone and peroxide on the treatment of perchlorate. We would greatly appreciate responses to as many of these questions as you can answer.

Water Quality and Chemical Treatment

1. Please provide information on the quality of the water treated at the Lante wellsite (e.g., general water chemistry, inorganic and organic constituents, bacteriological indicators).

2. What is the applied dosage of ozone and hydrogen peroxide?

3. What is the hydraulic residence time between ozone/peroxide treatment and contact with the activated carbon?

4. Does any residual ozone and/or hydrogen peroxide contact the activated carbon? If so, how much?

Effectiveness and Mechanism of Perchlorate Removal

5. You provided a graph of perchlorate concentration as a function of the volume of groundwater treated at the Lante wellsite. The graph shows perchlorate concentrations in the influent between approximately 60 and 100 ug/l; and effluent concentrations near 10 ug/l for most of the 10,000,000 gallons of treated water. Please provide more detailed data and any more recent results showing changes in perchlorate concentrations during treatment (e.g., before the oxidant is added, after the oxidant but before the carbon contactors, after the initial

carbon contactor, within any of the carbon beds, after the final carbon contractor). Please provide a schematic showing sample collection locations in relation to the oxidation and carbon vessels.

6. Do you expect to be able to reliably reduce the perchlorate concentration in the effluent to non detectable levels (i.e., less than approximately 4 ug/l)?

7. When (in gallons treated) was the carbon at the Lante site changed? Since the carbon change, how long has the process been run? What is the observed or expected effect of ozone/peroxide on the life and/or attrition rate of the activated carbon?

8. What other process changes have been made at the Lante wellsite and what has their effect been on perchlorate concentrations? (e.g., changes in oxidants, oxidant dosage, oxidant injection location, oxidant contact time, carbon media, reactor materials or construction)

9. What data are available to prove that perchlorate is being destroyed? Is there any evidence of increased chlorate, chlorite, hypochlorite, or chloride ion during treatment? (e.g., after the oxidant but before the carbon contactors, after the initial carbon contactor, after the final carbon contractor)

10. Have any tests been conducted to directly compare activated carbon adsorption at the site against activated carbon adsorption coupled to ozone/peroxide treatment?

11. Could the ozone/peroxide be reducing perchlorate concentrations by removing DOC from water? Dissolved organic carbon (DOC) is known to decrease the adsorption of anions such as perchlorate by activated carbon. What is the dissolved organic carbon (DOC) concentration in the water being treated before and after ozone/peroxide treatment?

12. You indicated that you believe that the perchlorate is being chemically-reduced. What is known or hypothesized about the chemical species playing a role in reducing the perchlorate? What is the evidence that biological processes are not responsible for the decrease in perchlorate concentration? What changes in water chemistry have been observed during treatment in addition to a reduction in perchlorate?

13. Have you attempted to determine how tightly bound the perchlorate is to the activated carbon?

Operation/ Cost

14. You provided a handout that compares costs of air stripping, carbon, and APT HiPOx (per acre-foot). Can you provide a more detailed breakdown of the capital and operating cost estimates?

EPA will handle the information you provide as confidential business information (CBI) if the criteria enumerated in applicable Federal Regulations (40 C.F.R. § 204(e)) are satisfied. I've have summarized the criteria in an enclosure.

Thanks again for taking the time to come to our Regional Office to discuss your work at the Lante well. I look forward to your response. Please contact me at (415) 744-2256 with any questions or comments.

Sincerely,

Wayne Praskins
EPA Project Manager

Enclosure

EPA CONFIDENTIALITY REGULATIONS

EPA will handle all or part of the information you provide as confidential business information (CBI) if the criteria enumerated in 40 C.F.R. § 204(e) are satisfied. To meet the requirements for CBI, please provide the following information:

1. The portions of your response that you believe are entitled to confidential treatment;

2. The period of time for which confidential treatment is desired (e.g., until a certain date, until the occurrence of a certain event, or permanently);

3. Measures taken by you to guard against the undesired disclosure of the information to others;

4. The extent to which the information has been disclosed to others and the precautions taken in connection therewith;

5. Pertinent confidentiality determinations, if any, by EPA or other Federal agencies, and a copy of any such determination;

6. Whether you assert that disclosure of this information would be likely to result in substantial harmful effects on your business's competitive position, and if so, what those harmful effects would be, why they should be viewed as substantial, and an explanation of the causal relationship between disclosure and such harmful effects; and

7. Whether you assert that the information is voluntarily submitted information and if so, whether and why disclosure of the information would tend to lessen the availability to EPA of similar information in the future. "Voluntarily submitted information" is defined in 40 C.F.R. § 2.201(i).